

What is Claimed is:

1. A protection device for monitoring current in a power cable to an electrical device and for controlling a starter for the electrical device in response to a system remotely located controller, the protection device comprising:

- (a) a transformer magnetically linked with said power cable connected to said electrical device, said transformer producing a voltage signal in response to the presence of a changing current within said power cable;
- (b) an input circuit located proximate to said transformer and having an output terminal and being electrically connected to said transformer so as to receive said voltage signal, said input circuit producing, in response to receiving said voltage signal, one of a first signal representative of said changing current, and a first circuit condition at said output terminal of said input circuit representative of said changing current in said power cable;
- (c) a switch circuit for sensing one of a second signal and a second circuit condition of a remotely located system controller and providing one of a third signal and a third circuit condition, in response to sensing one of said second signal and said second circuit condition, said third signal and said third circuit condition being effective to control said starter when said starter is electrically connected thereto; and,

- (d) all of said transformer, said input circuit, and said switch circuit being located in a single unitary package.

5           2. The protection device of claim 1 wherein said transformer includes a wire-wrapped toroidal core at least partially encircling said power cable.

10           3. The protection device of claim 1 where said toroidal core has a low magnetic permeability.

          4. The protection device of claim 1 wherein said first signal is a current signal.

15           5. The protection device of claim 4 wherein said current signal has a range of magnitude from about 4 ma to about 20 ma.

20           6. The protection device of claim 1 wherein said first signal is a voltage signal.

          7. The protection device of claim 6 wherein said voltage signal has a range of magnitude from about 0 volts to about 5 volts.

25           8. The protection device of claim 1 wherein said first circuit condition is one of a short circuit and an open circuit.

30           9. The protection device of claim 1 wherein said system controller is a programmable logic device.

          10. The protection device of claim 1 wherein said second signal is a direct current signal.

35           11. The protection device of claim 1 wherein said second signal is a alternating current signal.

12. The protection device of claim 1 wherein said second signal is a direct voltage signal.

5 13. The protection device of claim 1 wherein said second signal is an alternating voltage signal.

10 14. The protection device of claim 1 wherein said switch circuit includes a relay electrically connected to said system controller to sense said one of a second signal and second circuit condition.

15 15. The protection device of claim 1 wherein said switch circuit includes a triac electrically connected to said system controller to sense said one of a second signal and second circuit condition.

20 16. The protection device of claim 1 wherein said switch circuit includes an opto-isolator device to optically isolate said system controller from said starter.

25 17. The protection device of claim 1 wherein said switch circuit includes a rectifier circuit to rectify said second signal.

18. The protection device of claim 1 wherein said third circuit condition is a short circuit.

30 19. The protection device of claim 1 wherein said third circuit condition is an open circuit.